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;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;
;                            TRANSMITTER CODE
;
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base $10

 INCLUDE 'H705J1A.asm'                 ; equates for the HC705J1A

; This version is the COUNTER IR interface
; The clock taps the main processor 16/second.
; This version has microprocessor power level selection via pullups.


                 org      MOR
                 fcb      $A0             ; SHORT OSC DELAY


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;       Equates and RAM Storage
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;
;       I/O Pin Equates:
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PWRLEVL          equ      0                     ; PA0, POWER LEVEL LOW
CONTROL
PWRLEVM          equ      1                     ; PA0, POWER LEVEL MEDIA
CONTROL
PWRLEVH          equ      2                     ; PA0, POWER LEVEL HIGH
CONTROL
IRDOUT           equ      3                     ; PA3, ir data, output
LED              equ      5                     ; PA5, LED, OUTPUT
RBASE            equ      7                     ; PA7, RESET BASE TIMMING,
OUTPUT

PUHBUT           EQU      2                     ; pb2, PUSH BUTTON INPUT


        org RAM

QUIETMO          RMB      1                     ; QUIET MODE FLAG
PBCTR            RMB      1                     ; PUSH BUTTON DOWN TIMER
HIPOWER          RMB      1                     ; HIGH POWER MODE FLAG
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PSTIMER       RMB       1                   ; POWER SELECT TIMER


              org       EPROM               ; start at the top of EPROM

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POWER         RSP
              lda       #%01000111          ; set IR output for active
state
              sta       PORTA               ; release ir data
              lda       #%11110100          ; set IR data output so that
                                            ; IR is off
              sta       ddra                ; HIGH POWER MODE
              lda       #%01111111          ; disable pulldowns 0-6
              sta       pdra
              TST       QUIETMO             ; IN QUIET MODE?
              BNE       POWER3


              TST       HIPOWER             ; IN HIGH POWER MODE
              BNE       POWER0
              BSET      PWRLEVL,DDRA        ; DISABLE HIGH POWER CONTROL
              BSET      PWRLEVH,DDRA

POWER0        lda       #$07                ; 27 microsec 6*7+5=47
              bclr      irdout,porta
              bset      irdout,ddra         ;[5]
POWER1        deca                          ;[3] 1-CYC=.5747mS.
              bne       POWER1              ;[3]
              bclr      irdout,ddra         ;[5] ir led OFF

              lda       #$0F                ;[2] 50 microsec 6*15+2=90
POWER2        deca                          ;[3] 1-CYC=.559mS.
              bne       POWER2              ;[3]
              bset      RBASE,porta         ; reset the base time

POWER3        BSR       PROCPB              ; PROCESS THE PISHBUTTON

POWER4        TST       PSTIMER             ; LED TIMER ACTIVE
              BEQ       POWER5
              BSET      LED,PORTA
              BSET      LED,DDRA
              DEC       PSTIMER
POWER5                  stop

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PROCPB        BRCLR     PUHBUT,PORTB,PBNOT  ; IS THE PB PUSHED?
              TST       QUIETMO             ; FLASH LED IF IN QUIET MODE
              BEQ       PROCPB1

              BSET      LED,PORTA           ; LED ON
              BSET      LED,DDRA
              lda       #$FF                ;[2] 256*18=4608 cyc
PROCPBD       deca                          ;[3]
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                inca                            ;[3]
                deca                            ;[3]
                inca                            ;[3]
                deca                            ;[3]
                bne     PROCPBD                 ;[3]
                BCLR    LED,PORTA               ; LED OFF


PROCPB1         LDA     PBCTR                   ; DO NOT GO ABOVE 255
                CMP     #$FF
                BEQ     POWOOS
                INC     PBCTR                   ; BUMP THE PB ACTIVE COUNTER
                LDA     PBCTR                   ; BETWEEN 4 AND 6 SECONDS
                CMP     #$40                    ; LED ON AT 4 SECONDS
                BLO     POWOOS
                LDA     #$50                    ; set LED timer
                STA     PSTIMER
                STA     HIPOWER                 ; SET HIGH POWER MODE
                CLR     QUIETMO                 ; EXIT QUIET MODE
                BSET    LED,PORTA               ; LED ON
                BSET    LED,DDRA
                LDA     PBCTR                   ; LED OFF AT 6 SECONDS
                CMP     #$60
                BLO     POWOOS
                BCLR    LED,PORTA
                CLR     PSTIMER                 ; NO LED TIME IN LOW POWER
MODE
                CLR     HIPOWER                 ; SET LOW POWER MODE
POWOOS                  RTS


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PBNOT           LDA     PBCTR                   ; ENTRY INTO QUIET MODE?
                CMP     #$40                    ; >2 SECONDS, EXIT/ENTER
QUIET MODE
                BLO     PBNOT1
                CMP     #$A0                    ; >10 SECONDS DOWN?
                BLO     PBNOT2
                LDA     #1                      ; SET QUIET MODE
                STA     QUIETMO
PBNOT1          CLR     PBCTR                   ; CLEAR THE PB DOWN COUNTER
                RTS
PBNOT2          CLR     QUIETMO                 ; EXIT QUIET MODE
                BRA     PBNOT1


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;;; reset vectors:

                org     $07f8
                fdb     POWER
                fdb     POWER
                fdb     POWER
                fdb     POWER
                end
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;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;
;                          RECEIVER CODE
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 base $10

 INCLUDE 'H705J1A.asm'                ; equates for the HC705J1A

; This is the Standard version seed = $0000
; This version is the COUNTER IR receiver/418 transmitter
; The clock taps the main processor 16/second.
; The xtal is 4 Mhz.


ID          EQU    $11               ; COUNTER ACCUMULATOR
SID         EQU    $10               ; SERVICE ID
XMPERIOD    EQU    $0A               ; transmitt period = 10 seconds
SEEDMSB     EQU    $00               ; MSBYTE SEED FOR POINT SIX
                                     ; STANDARD
SEEDLSB     EQU    $00               ; LSBYTE SEED FOR POINT SIX
                                     ; STANDARD




            org    MOR
            fcb    $A0               ; SHORT OSC DELAY

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;         Equates and RAM Storage
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; I/O Pin Equates:
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TPS            equ     $10           ; 16 ticks/second

IRPWR          equ     0             ; PA0, IRPOWER, output
LCDCLR         equ     1             ; PA1, LCD CLR, OUTPUT
LED            equ     2             ; PA2, LED DRIVE ACTIVVE HIGH,
                                     ; OUTPUT
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IRIN            equ         3                       ; PA3, ir data, INPUT
LCDCTR          equ         4                       ; PA4, LCD CTR, output
SPARE5          equ         5                       ; PA5, SPARE, OUTPUT
radio           equ         6                       ; PA6, radio transmit data, OUTPUT
RBASE           equ         7                       ; PA7, RESET BASE TIMER, OUTPUT


PUHBUT          equ         2                       ; PB2, PUSHBUTTON INPUT
SPAREB3         equ         3                       ; PB3, SPARE, OUTPUT


OSWITCH         equ         0                       ; open-door status bit in STATUS
CSWITCH         equ         1                       ; close-door status bit in STATUS



        org RAM

BYCT            RMB         2                       ; BYTE COUNT
CHAR            RMB         1                       ; CHARACTER STORE FOR SERIAL DATA
TEMPA           RMB         2                       ; TEMP STORAGE
SECOND          RMB         1                       ; second sub counter
SUBCTR          RMB         1                       ; SUB COUNTER
STATUS          RMB         1                       ; STATUS BITS 0,1
PBCTR           RMB         1                       ; PUSH BUTTON DOWN COUNTER
SETUPMOD        RMB         1                       ; TEST MODE FLAG
SETUPTIM        RMB         1                       ; SETUP TIMER
HOLDOFF         RMB         1                       ; TRANSMISSION HOLDOFF
XPEND           RMB         1                       ; XMIT PENDING
MISSED          RMB         1                       ; MISSED IR RECEPTION ON
                                                    ; LAST CYCLE FLA
MULBLOCK        RMB         1                       ; MULTIPLYER FOR BLOCKED TIMER
SERVICE         RMB         1                       ; SERVICE
QUIETMO         RMB         1                       ; QUIET MODE FLAG, 1=NO
                                                    ; TRANSMISSIONS
TOTMSEC         RMB         1                       ; TOTAL MISSED SECONDS COUNTER
LVALID          RMB         1                       ; LAST PULSE WAS A VALID PULSE
ALLRSYN         RMB         1                       ; ALLOW-RESYNC-ATTEMPT FLAG
LOOKTIME        RMB         1                       ; LOOK FOR PULSE TIMER
REPEAT          RMB         1                       ; REPEAT ON NEXT SECOND

;;;;;;; THIS IS THE START OF THE TRANSMITT DATA PACKET
TYPEID          RMB         1                       ; TYPE ID FIELD
SHORTSN         RMB         4                       ; SHORT SERIAL NUMBER THIRTY BITS
CYCOPEN         RMB         3                       ; COUNTER FOR OPEN SWITCH
TOTMISS         RMB         3                       ; COUNTER FOR OUT OF SYNC
WWCRC           RMB         2                       ; CRC16
;;;;;;; THIS IS THE END OF THE TRANSMITT DATA PACKET

WWBYCT          RMB         1                       ; BYTE COUNT
TTIME           RMB         1                       ; TRANSMITT CELL TIME
NODE            RMB         1                       ;
RANDOML         RMB         1                       ; RANDON COUNTER
RETRYX          RMB         1                       ; 10 SECOND RETRY TRANSMITTER

        org     EPROM                               ; start at the top of EPROM


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SERIAL          FCB  $30,$10,$20,$00  ; SERIAL NUMBER

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POWER           RSP
               bclr  irqe,iscr        ; disable external int
               lda   #%00100001       ; ON THE TSOP700
               sta   PORTA            ;
               lda   #%11100101       ;[2]
               sta   ddra             ;[4]
               lda   #%11111111       ;[2] DISABLE PULL DOWNS.
               sta   pdra             ;[4]
               bset  irqr,iscr        ;[3] clear the irq
               lda   #$00             ;[2] LOW OUTPUTS
               sta   PORTB            ;[4]
               lda   #$08             ;[2] PB2 IS AN INPUT
               sta   ddrb             ;[4]
               lda   #$00             ;[2] Enable pulldowns ON PORTB
               sta   pdrb             ;[4]
               TST   QUIETMO          ;[4] TEST FOR QUIET MODE
               BNE   POWER1           ;[3]
               LDA   LVALID           ;[3]
               CLR   LVALID           ;[4] LAST PULSE INVALID BY DEFAULT
               TSTA                   ;[3]
               BNE   PULSE            ;[3] YES, PULSE ANOTHER
               TST   ALLRSYN          ;[4] RESYNC ATTEMPT ALLOWED
               BNE   RESYNC           ;[3] 53 CYC
               JSR   MTOTAL           ; TOTAL THE MISS
               BRA   SLEEP
POWER1         DEC   QUIETMO          ; GET THE FLAG/TIMER
               BNE   SLEEP            ; BUMP IT TOWARD ZERO
               LDA   #TPS             ; RESET THE TIMER/FLAG
               STA   QUIETMO          ; FOR 1 SECOND LCD TICK
               BCLR  LCDCTR,PORTA     ; COUNT THE TICK
               BSET  LCDCTR,DDRA      ; ON THE LCD
               BRA   SLEEP


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RESYNC         LDA   #$08             ;[2] + 53-cyc sense ir sense on
RESYNC1        DECA                   ;[3] MUST NOT TEST FOR 50MS,
                                      ;    100 CYC
               BNE   RESYNC1          ;[3] 53+N*6=100, N=8

RESYNC2        LDA   #$FF             ;[2]
               STA   LOOKTIME         ;[4] CLEAR THE OVERALL LOOK TIMER
RESYNC3        BRCLR IRIN,PORTA,IRVT  ;[5] HIT OR TIMEOUT!
               DEC   LOOKTIME         ;[5] MOVE THE LOOK TIMER
               BNE   RESYNC3          ;[3] (7.5)*256=1920 CYC, 1 MILLI

               JSR   NOWOP            ; BEAM PATH IS NOW OPEN
               JSR   MTOTAL           ; TOTAL THE MISS
               JSR   CYCEND           ; DO THE CYCLE END STUFF
               TST   SETUPMOD         ; RESET THE SETUP TIMER
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                    BEQ     RESYNC4                 ; IF IN SETUP MODE
                    LDA     #$FF
                    STA     SETUPMOD
RESYNC4             BRSET   IRIN,PORTA,RESYNC4; HIT OR TIMEOUT!
                    BRA     IRVT


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PULSE               LDA     #$09                    ;[2] 2+ 46-cyc sense ir sense on
PULSE1              DECA                            ;[3] MUST NOT TEST FOR 50MS, 100
                                                    ;    CYC
                    BNE     PULSE1                  ;[3] 48+N*6=100, N=9

                    LDA     #$07                    ;[3] THEN LOOK FOR LOW WITHIN 50
                                                    ;    MS.
PULSEX              BRCLR   IRIN,PORTA,IRVT         ;[5] POSSIBLE HIT OR TIMEOUT!
                    INC     RANDOML                 ;[5] RANDOMIZE
                    DECA                            ;[3]
                    BNE     PULSEX                  ;[3] 16*N=100, N=7
                    BRA     INVALID

IRVT                LDA     #$09                    ;[2] MUST GO HIGH AGAIN WITHIN 50MS
IRVTL               BRSET   IRIN,PORTA,IRVALID;[5] AFTER GOING LOW
                    DECA                            ;[3]
                    BNE     IRVTL                   ;[3] 2+11*N=100CYC, N=9
INVALID             BRA     RESYNC2                 ; ATTEMPT TO RESYNC.


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IRVALID             BSET    RBASE,PORTA             ; RESET TIMEBASE, NOW IS 0 TIME
                    BCLR    IRPWR,DDRA              ; POWER DOWN THE SENSOR
IRHIT               TST     MISSED                  ; THE PATH IS CLOSED ONLY IF
                    BNE     IRHIT2                  ; THE LAST PULSE WAS ALSO VALID
                    TST     SETUPMOD                ; TEST MODE?
                    BEQ     IRHIT1
                    BSET    LED,PORTA               ; FLASH THE LED IN TEST MODE
                    BSET    LED,DDRA
                    DEC     SETUPMOD                ; COUNT THE FLASH
IRHIT1              JSR     NOWCL                   ; BEAM PATH IS NOW CLOSED
IRHIT2              CLR     MISSED                  ; CLEAR THE MISS CTR
                    CLR     MULBLOCK                ; AND THE MULTIPLYER FOR BLOCKED
                    LDA     #1                      ; SET PULSE VALID
                    STA     LVALID
                    BRA     SLEEP


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SLEEP               BSR     CYCEND                  ; DO THE CYCLE END STUFF
                    BCLR    RADIO,PORTA             ; RADIO OFF
                    BCLR    IRPWR,DDRA              ; ir sub system off
                    BSET    irqr,iscr               ; clear the irq
                    STOP


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CYCEND      LDA     SECOND          ; SUB SECOND COUNTER
            BEQ     CYCENDRL        ; EXPIRED SECOND, RELOAD
            DECA
            STA     SECOND
            TST     SERVICE         ; TRANSMIT SERVICE NOW
            BNE     CYCENDXM
            TST     SECOND
            BNE     CYCENDS

            TST     SETUPTIM        ; SETUP TIMER RUNNING?
            BEQ     CYCENDRL
            DEC     SETUPTIM
            BNE     CYCENDRL
            CLR     SETUPMOD        ; EXIT SETUP MODE, TIMEOUT
CYCENDRL    LDA     #TPS            ; SET   TICKS/SEC
            STA     SECOND
            LDA     SUBCTR          ; SUB INTERVAL COUNTER
            DECA
            AND     #$3F
            STA     SUBCTR
            BNE     CYCEND1
            LDA     RANDOML         ; RANDOMIZE
            LDX     RANDOML
            EOR     POWER,X
            AND     #$07
            ADD     #XMPERIOD       ; ADD LSBIT TO TRANSMITT PERIOD
            STA     SUBCTR          ; RANDOM 0-7 SECOND SLIP OF
                                    ; INTERVAL
            STA     XPEND
CYCEND1     TST     SERVICE         ; TRANSMIT SERVICE NOW
            BNE     CYCENDXM
            TST     REPEAT          ; REPEAT PACKET?
            BEQ     CYCEND2
            CLR     REPEAT          ; KILL REPEAT FLAG
            BRA     CYCENDXM        ; TRANSMIT AGAIN
CYCEND2     TST     HOLDOFF         ; HOLDOFF TIMER
            BEQ     CYCEND3
            DEC     HOLDOFF
            BNE     CYCENDS
CYCEND3     LDA     XPEND           ; XMIT PENDING?
            BEQ     CYCENDS         ; NO.
            STA     REPEAT          ; SET TO REPEAT
CYCENDXM    TST     QUIETMO         ; DO NOT TRANSMITT IN QUIET MODE
            BNE     CYCENDNX
            JSR     XPACKET         ; TRANSMIT PACKET
CYCENDNX    CLR     XPEND           ; CLEAR PENDING FLAG
            LDA     #$0A            ; HOLD OFF FOR 10 SECONDS
            STA     HOLDOFF         ; THE NEXT TRANSMISSION
            TST     RETRYX          ; RETRYS REMAINING?
            BEQ     CYCENDS
            DEC     RETRYX
            LDA     #$0A            ; SET 10 SECOND RETRY XMIT TIMER
            STA     SUBCTR
CYCENDS     JSR     PROCPB          ; PROCESS THE PUSH BUTTON
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CYCENDSS    RTS

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NOWCL       BCLR   OSWITCH,STATUS      ; "CLOSED", CLEAR THE OPEN STATUS
            BRSET  CSWITCH,STATUS,NOWOPE  ; IS IT NEW?
            BSET   CSWITCH,STATUS      ; "NEW" SET THE CLOSED STATUS
            BRA    XPRETRY             ; CAUSE A TRANSMISSION
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;


NOWOP       BCLR   CSWITCH,STATUS      ; "OPEN", CLEAR THE CLOSED STATUS
            BRSET  OSWITCH,STATUS,NOWOPE
            BSET   OSWITCH,STATUS      ; NEW, SET THE "OPEN" STATUS
            BCLR   LCDCTR,PORTA        ; COUNT THE HIT
            BSET   LCDCTR,DDRA         ;
            INC    CYCOPEN             ; COUNT THE ACTIVE STATE
            BNE    XPSETLED            ; TRANSMIT DATA
            INC    CYCOPEN+1
            BNE    XPSETLED            ; TRANSMIT DATA
            INC    CYCOPEN+2
XPSETLED    BSET   LED,PORTA           ; FLASH THE LED
            BSET   LED,DDRA            ;
XPRETRY     LDA    #3                  ; SEND THREE MORE AT 10 SEC PERIOD
            STA    RETRYX
            LDA    #1                  ; SET THE XMIT PENDING FLAG
            STA    XPEND               ; TO ENABLE TRANSMIT DATA
NOWOPE      RTS


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MTOTAL      INC    TOTMSEC             ; SUB SECOND COUNTER
            LDA    TOTMSEC
            CMP    #TPS                ; TICKS PER SEDOND
            BLO    MTOTAL1
            CLR    TOTMSEC
            INC    TOTMISS             ; BUMP TOTALS, 8 HRS=007080h
            BNE    MTOTAL1
            INC    TOTMISS+1           ; 256 SEC/COUNT
            BNE    MTOTAL1
            INC    TOTMISS+2           ; 65536 SECONDS/COUNT, 1=18.2 HRS
MTOTAL1     INC    MISSED              ; NOT MAXED, BUMP IT.
            LDA    MISSED              ; GET THE MISSED COUNTER
            CMP    #$E8                ; ACT NORMAL FOR 232-CYC BLOCKED
            BLO    MTOTALM             ; INDICATE WINDOW HERE
            CMP    #$FF                ; (255-232)CYC, REPEAT OPEN WINDOW
            BLO    MTOTALB             ; BLOCK RESYNC ATTEMPT UNTIL WINDOW
            LDA    #$E8                ; YES,SET BACK TO 15 SEC POINT
            STA    MISSED              ; TEST FOR RESYNC EVERY 1.5*4 SEC
            INC    MULBLOCK            ; INCREMENT THE MULTIPLYER
            LDA    MULBLOCK
            CMP    #$04
            BLO    MTOTALB             ; BLOCK RESYNC ATTEMPT ON NEXT CYC
            CLR    MULBLOCK
MTOTALM     LDA    #1                  ; ALLOW RESYNC ATTEMPT ON NEXT CYC
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              STA     ALLRSYN
              RTS
MTOTALB       CLR     ALLRSYN            ; BLOCK RESYNC ON NEXT CYCLE
              RTS


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PROCPB        BRCLR   PUHBUT,PORTB,PBNOT; IS THE PB PUSHED?
              LDA     PBCTR              ; DO NOT GO ABOVE 255
              CMP     #$FF
              BEQ     POWOOS
              INC     PBCTR              ; BUMP THE PB ACTIVE COUNTER
              LDA     PBCTR              ; IF >4 SECONDS, CLEAR LCD CTR
              CMP     #$40
              BEQ     PROCPB1            ; SET CLEAR LCD/COUNT MODE
POWOOS        RTS

PROCPB1       BCLR    LCDCLR,PORTA       ; SET THE LCD CLEAR LOW
              BSET    LCDCLR,DDRA
              CLR     CYCOPEN
              CLR     CYCOPEN+1
              CLR     CYCOPEN+2
              CLR     TOTMSEC
              CLR     TOTMISS            ; CLEAR THE TOTAL MISSED COUNTER
              CLR     TOTMISS+1
              CLR     TOTMISS+2
              CLR     SETUPMOD           ; CLEAR THE SETUP MODE
              CLR     SETUPTIM
              CLR     QUIETMO            ; EXIT QUIET MODE
              RTS

PBNOT         LDA     PBCTR              ; SET TEST MODE ON PB UP
              CMP     #1                 ; COUNT MUST BE ABOVE 1
              BLS     PBNOTC
              CLR     SETUPMOD           ; CLEAR THE SETUP MODE
              CLR     SETUPTIM
              CMP     #$28               ; IF LCD CLEAR DO NOT ENTER TEST
              BHS     PBNOTCQ            ; OR IF SERVICE MODE
              LDA     #1                 ; SET SERVICE MODE
              STA     SERVICE
              LDA     #$80               ; SET TEST MODE TIMER/STATUS
              STA     SETUPMOD           ; HITS REQUIRED TO EXIT SETUP MODE
              LDA     #$3C               ; 120 SECOND MAX TIME FOR SETUP
              STA     SETUPTIM
              CLR     MISSED             ; CLEAR THE MISS CTR
              CLR     MULBLOCK           ; AND THE MULTIPLYER FOR BLOCKED
PBNOTC        CLR     PBCTR              ; CLEAR THE PB DOWN COUNTER
              RTS
PBNOTCQ       CMP     #$80               ; 8 SECONDS PUSHED?
              BLO     PBNOTC
              LDA     #TPS               ; SETUP FOR 1/SEC COUNT
              STA     QUIETMO            ; SET QUIET MODE
              BRA     PBNOTC


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XPACKET     LDA     SERIAL                  ; GET THE SERIAL NUMBER
            STA     SHORTSN
            LDA     SERIAL+1
            STA     SHORTSN+1
            LDA     SERIAL+2
            STA     SHORTSN+2
            LDA     SERIAL+3
            AND     #$FC
            STA     SHORTSN+3
            LDA     MISSED                  ; GET THE MISSED COUNTER
            CMP     #$E8                    ; BLOCKED?
            BHS     XPACKBK
            LDA     STATUS                  ; GET THE STATUS INPUTS
            AND     #$03                    ; MASK THE STATUS
            ORA     SHORTSN+3
            STA     SHORTSN+3


XPACKBK     LDA     #ID                     ; SET THE TYPE FIELD
            STA     TYPEID
            TST     SERVICE                 ; SERVICE MODE?
            BEQ     RWAVES
            LDA     #SID                    ; GET SERVICE ID
            STA     TYPEID
            CLR     SERVICE
RWAVES      BSR     WRCCAL                  ; CALCULATE CRC 16 OF DATA
RWAVE       LDA     #$0D                    ; SEND BLKSIZE+2 BYTES
            STA     WWBYCT
            LDX     #TYPEID                 ; point to ID,data
RWAVEX      BSET    radio,PORTA             ; RADIO ON FOR 1000 MICROSEC
            LDA     #$A7                    ; 12*N=2000 CYCLES, N=167
RWAVEI      DECA                            ;[3]
            INCA                            ;[3]
            DECA                            ;[3]
            BNE     RWAVEI                  ;[3]
RWAVE1      BSR     Putchar                 ;[6]
            INCX                            ;[3]
            DEC     WWBYCT                  ;[3] BYTE COUNT IMAGE
            BNE     RWAVE1                  ;[3] 15 CYCLES OF OVERHEAD
                                            ; INTRABYTE
            BCLR    RADIO,PORTA             ; RADIO OFF
            RTS                             ;


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WRCCAL      LDA     #SEEDLSB                ; SEED LSB
            STA     WWCRC+1                 ; SEED THE CRC
            LDA     #SEEDMSB                ; SEED MSB
            STA     WWCRC
            LDA     #$0B                    ; BYTES TO CRC
            STA     WWBYCT
            LDX     #TYPEID                 ; POINT TO DATA RECORD
WRCCAL0     LDA     ,X
            INCX
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WRCBYT          EOR       WWCRC+1           ; EOR DATA WITH CRC LSB
                STA       WWCRC+1
                LDA       #8                ; SET 8 BIT COUNTER
                STA       Node
WRCCAL1         LSR       WWCRC             ; SHIFT IT RIGHT ONE PLACE
                ROR       WWCRC+1
                BCC       WRCCAL2
                LDA       WWCRC
                EOR       #$A0
                STA       WWCRC
                LDA       WWCRC+1
                EOR       #$01
                STA       WWCRC+1
WRCCAL2         DEC       Node
                BNE       WRCCAL1

                DEC       WWBYCT
                BNE       WRCCAL0
                LDA       WWCRC             ; REVERSE LSB/MSB
                COMA
                STA       WWBYCT
                LDA       WWCRC+1
                COMA
                STA       WWCRC
                LDA       WWBYCT
                STA       WWCRC+1
                RTS


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;;; reset vectors:
;               org       Timer_INT
;
;               fdb       Timer_SVR
;
;
;
;               org       IRQ_INT
;
;               fdb       IRQ_SVR
;
;
;
;               org       SWI_INT
;
;               fdb       SWI_SVR
;
;
;
;               org       RESET
;
;               fdb       Start
;
```

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```
        org     $07f8
        fdb     POWER
        fdb     POWER
        fdb     POWER
        fdb     POWER

        end
```